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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,029	02/03/2006	Hartmut Hibst	284810US0PCT	9923
22850	7590	11/13/2009	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314			PATEL, SMITA S	
			ART UNIT	PAPER NUMBER
			1793	
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			11/13/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/567,029	<b>Applicant(s)</b> HIBST ET AL.	
	<b>Examiner</b> SMITA PATEL	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7,8 and 10-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7,8 and 10-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Applicant's amendment filed on July 17, 2009 has been entered.
2. Claim 7-8 and 10-27 are under examination. Claims 7-8 and 11-12 has been amended, Claim 9 has been cancelled and new Claims 13-27 has been added by the applicant.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 7-12** are rejected under 35 U.S.C. 103(a) as being obvious over by Hibst et al (US PG PUB No.: 2004/0147393 A1, subject matter supported in provisional application No.:60/476,165 filed on June 06, 2003) in view of Nelson et al (US PG PUB No.: 2003/0035756 A1).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed

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in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

**As per Claim 7,** Hibst teaches a process for preparing a multimetal oxide composition, in which a mix solution is produced continuously in a solvent from a required starting compounds of the elemental constituents of the multimetal oxide composition, the mix solution is fed continuously into drying apparatus for removing solvent and the solid obtained is treated thermally at elevated temperature, with the thermal treatment comprising a calcination at from 200 to 1200° C, wherein at least two physically separate part solutions each containing partial amounts of the required starting compounds of the elemental constituents of the multimetal oxide composition in dissolved form are firstly prepared, at least two part solution streams are produced from the two or more part solutions, the two or more part solution streams are combined to form a total solution stream, the total solution stream is passed through a mixing zone in which mix solution stream comprising the total amount required starting compounds in dissolved form is formed, the mix solution stream is either broken up into fine droplets in the mixing zone or the mix solution stream is discharged from the mixing zone and then broken up into fine droplets, the fine droplets of mix solution are dried by contact with

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hot gas and the solid obtained is treated thermally at elevated temperature with the thermal treatment comprising a calcination at from 200 to 1200°C.

Hibst further teaches examples that define the process for preparing a multimetal oxide composition M:

Solution A was prepared by containing 4,000 ml of water that was heated at 80° C in glass vessel, 706.2 g of ammonium heptamolybdate having MoO<sub>3</sub> content were dissolved and then 141.0 g of ammonium metavanadate having V<sub>2</sub>O<sub>5</sub> were stirred into and dissolved therein. Solution A having total volume of 4,500 ml.

Solution B was prepared containing 221.28g of niobium ammonium oxalate having Nb content dissolved in 1,000 ml of water which had been heat treated at 80° C. Solution B having total volume of 1,500 ml (considered two separate solutions of the chemical element present in the catalyst and optionally of dispersions of inorganic support materials, page 12 paragraph [0222-0223]).

Two solutions A and B were subsequently pumped continuously by means of two ProMinent laboratory metering pumps via Y-shaped plastic T-piece. The three tubular parts of the T-piece each had an internal diameter 5 mm and the length of 38 mm.

The solution A was conveyed at flow rate of 1,500 ml/h and the solution B was conveyed at a flow rate of 500 ml/h. In the interior of the T-piece, the two solutions were combined to give total solution stream of 2,000 ml/h which flowed into the outlet piece of the T-piece. A static mixer model SMXS from Sulzer Chemtech was located in the latter (piece (considered continuously metering the at least two different solutions I

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predefined ratio into mixing apparatus in which they are homogeneously mixed, pages 12-13, paragraph [0224]) .

The end outlet piece of the T-piece was connected directly to the atomizer head of spray dryer which atomized the mix solution stream fed in (droplet size of 30  $\mu\text{M}$ ). Within the atomizer head, which was located in the center of the hot air distributor affixed at the top of the spray dryer, the mix solution stream flowed through 15 cm long connecting line having an internal diameter of 6 mm directly onto atomizer disk. The entire 6,000 ml of total solution stream were able to spray dried over a period of 3 hours. Solution A and B were converted into essentially homogenous mix solution stream. It took about less than ten seconds from combination of the solutions to dry powder. 150 g of resulting spray-dried powder were heated from room temperature to 275 °C at heating rate of 5° C/min in air in rotary sphere furnace (considered drying the mixture via spray drying, removed from the apparatus and recovering dried mixture, page 13 paragraphs [0224 - 0226]).

Immediately afterwards, powders was heated from 275° C to 650° C at a heating rate of 2° C/min in a stream of molecular nitrogen and this temperature was held for 6 hours while maintaining the flow of nitrogen. The powder was subsequently allowed to cool naturally to 25° C while maintaining flow of nitrogen. A black calcined multimetal oxide active composition M was obtained. The calcined material was milled and 75 g of resulting powder were applied to 152 g of spherical support bodies (considered optionally shaping and optionally calcining mixture to give the solid, page 13 paragraphs [0226-0227]).

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This example was repeated but the part solution stream A was 3000 ml/h (instead of 1500 ml/h) and the part solution B was 1000 ml/h (instead of 500 ml/h). In addition the inlet temperature of the spray dryer was set to 400° C instead of 320° C. In this case it took about 5.5 seconds from combining the solutions to spray-drying and the 6000 ml of total solution stream were spray dried over a period of 1.5 hours (considered repeating step till dried mixture was obtained, page 13 paragraphs [231-0232]). Hibst does not expressively mention that changing the ratios and repeating steps till dried mixture is obtained and does not expressively mention production of library of N different solids, however Hibst does mention of making multimetal oxide compositions M [0039] (plural compositions) which means that it would be obvious to vary the molar ratios of different compositions to form different compositions.

However Nelson teaches a continuous process for the production of combinatorial libraries of chemically-synthesized or blended materials in a high throughput fashion. It allows libraries members to be continuously made and collected comprising providing at least one plug flow reactor, introducing one or more components into the plug flow reactor, introducing or changing over time at least one variable affecting one or more components to product combinatorial library of materials. Variables that can be changed when conducting the method include, concentration of starting material, type of starting material, pressure in the reactor, temperature profile in the reactor, amount of energy supplied to a reaction zone, type of component mixing, degree of component mixing, residence time and where and when additional components are introduced into

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the plug flow reactor. The variables may be changed in continuous manner or stepwise manner (paragraphs 0005-0007).

It would have been obvious to one of the ordinary skill in the art at the time of invention to combine the method of Hibst to produce the multimetal oxide compositions M (plural compositions) with the method taught by Nelson to include the varying different concentration of starting materials and producing in combinatorial libraries in continuous manner to scale libraries of polymerization from laboratory scale quantities to production scale quantities as taught by Nelson.

**As per Claim 8,** Hibst teaches a process for preparing a multimetal oxide composition above in Claim 7 wherein the time period between mixing the solutions and drying is less than 10 seconds (encompasses applicant's claimed range of less than 10 minutes, page 13 paragraph [0225]).

**As per Claim 10,** Hibst teaches a process for preparing a multimetal oxide composition above in Claim 7, wherein solids produced 150 g (encompassed applicant's claimed range from 0.1 to 500 g, page 13 paragraph [0226]).

**As per Claim 11,** Hibst teaches a process for preparing a multimetal oxide composition above in Claim 7 which is similar to applicant's disclosure which included two solutions were pumped continuously by means of two ProMinent metering pumps via two separate plastic hoses into two inlet pieces of Y-shaped plastic T-piece, therefore the process performed for preparing multimetal oxide is expected to possess similar characteristics such as ratio is set and changed by central computer control of the output of pumps.



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**As per Claim 12,** Hibst teaches a process for preparing a multimetal oxide composition above in Claim 7 wherein the catalyst bed can be a fixed bed, a moving bed or fluidized bed where shaping can be carried out, for example of extrusion or tableting in the case of all-active catalysts or by application to a support body. This is further explained the example described, the calcined material was milled and 75 g of resulting powder were applied to 152 g of spherical support bodies (page 5 paragraphs [0074-0075] and page 13 paragraph [0227-0228]).

4. **Claims 7-12** are rejected under 35 U.S.C. 103(a) as being obvious over by Schunk et al (US PG PUB No.: 20010039330 A1) in view of Ushikubo et al (EP O603836 A1) and in further view of Nelson et al (US PG PUB No.: 2003/0035756 A1).

**As per Claim 7,** Schunk teaches a process for preparing arrays of heterogeneous catalysts and/or their precursors through channels and in which at least n channels comprise n different heterogeneous catalyst and/or their precursors, where n is 2, preferably 10 or more, more preferably 10,000 or more comprising following steps:

a) preparing of mixtures of different chemical compositions or plurality of mixtures of the same composition solutions, emulsions and/or dispersions of elements and/or elements compounds of chemical elements present in the catalysts

b) mixing predetermined amounts of the solutions, emulsions and/or dispersions in one or more reaction vessels run in parallel mixing can be metered using automated pipettes or an inkjet unit (paragraphs 0031, 0088 and 0099).

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Schunk does not expressively mention drying the mixture wherein the drying is performed by spray drying or spray freeze drying to produce solid mixture defined in step c and changing ratios defined in step d.

However Ushikubo teaches a process for preparing the solution containing essential elements for the catalyst is not particularly limited and it may be such that prescribed amounts of starting materials corresponding to the composition of the desired complex oxide are mixed with a solvent such as water. So long as the mixture forms a uniform solution (considered homogenously mixture). Solution or slurry is dried by spray drying method or freeze –drying method (page 3, lines 37-58) Solid particles are obtained by spray drying (page 4 lines 8-9). Ushikubo does not expressively define the changing ratios as defined in step d.

However Nelson teaches a continuous process for the production of combinatorial libraries of chemically-synthesized or blended materials in a high throughput fashion. It allows libraries members to be continuously made and collected comprising providing at least one plug flow reactor, introducing one or more components into the plug flow reactor, introducing or changing over time at least one variable affecting one or more components to product combinatorial library of materials. Variables that can be changed when conducting the method include, concentration of starting material, type of starting material, pressure in the reactor, temperature profile in the reactor, amount of energy supplied to a reaction zone, type of component mixing, degree of component mixing, residence time and where and when additional components are introduced into

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the plug flow reactor. The variables may be changed in continuous manner or stepwise manner (paragraphs 0005-0007).

It would have been obvious to one of the ordinary skill in the art at the time of invention to combine the process of Schunk with Ushikubo to include the drying by freeze-drying method or spray-drying method of solutions prepared to improve the yield of nitrile by using specific crystal structure as taught by Ushikubo. Further, it would have been obvious to one of the ordinary skill in the art to combine the process of Schunk and Ushikubo with process of Nelson to include the varying different concentration of starting materials and producing in combinatorial libraries in continuous manner to scale libraries of polymerization from laboratory scale quantities to production scale quantities as taught by Nelson.

**As per Claim 8,** Schunk nor Ushikubo nor Nelson teaches the process for preparing catalyst wherein time period between mixing solutions and drying is less than 10 minute. However Ushikubo does mention that as long as the mixture forms a uniform solution or slurry, it unnecessary to heat it or conduct stirring for long period of time so it would have been obvious to conduct the mixing and drying less than 10 minutes to improve the yield of nitrile using specific crystal structure as taught by Ushikubo (page 3 lines 43-45).

**As per Claims 10 and 18,** Ushikubo teaches process wherein the different solids are produced in each case in amounts from 0.1 to 500 g (see examples).

**As per Claims 11-12,** Nelson teaches the system having pump which feeds the components into reactor and capability to change or adjust the reaction conditions as

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well as the length time to which each sample is subjected to the reaction conditions (paragraphs 0006, 0007, 0041,0057 and 0061-0070). Further Nelson teaches at least one plug flow reactor introducing one or more components into the plug flow reactor and evaluating the materials for library so it would have been obvious that one more components can be introduced into multiple reactors and testing each solid for desired catalytic property so that libraries formed with this system can have members with masses greater than member made in confined volumes, e.g., to the size of microtitre plates, and can be made at higher process rates as taught by Nelson.

**As per Claims 13-17** Schunk teaches wherein N is 2 or more, preferably 10 or more, 100 or more, 1000 or more or even 10,000 or more (encompasses claimed range, paragraph 0088).

**As per Claims 19-20**, Ushikubo teaches catalyst constitutes from 10 to 60 wt% of at least two different solutions (examples, page 3 lines 50-53, overlap claimed range).

**As per Claims 21-22**, Ushikubo teaches unique element comprising of ammonium metavanadate (page 3 lines 47-48).

**As per Claims 21-27**, Schunk teaches unique element comprising salts of organic or inorganic and active metal is in subgroups 5 and 6 and in platinum (paragraph 0091, platinum is considered transition metal).

### **Response to Amendment**

Applicant has amended claim 7-8 and 11-12, cancelled Claim 9 and added new Claims 13-27 which necessitated new ground of rejection. See new ground of rejection above

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and therefore, the applicant's arguments, filed on 07/17/2009, are moot in view of the new ground(s) of rejection.

**Regarding to applicant argument for related to prior art taught by Hibst**, Examiner disagree with applicant's argument to withdraw the rejection of Hibst as reference under 103(c) for the following reason: In order to disqualify prior art under 103(c), applicant needs to provide proper statement which mentions: For example, A statement such as "Application X and Patent Z were, at the time the invention of Application X was made, jointly owned by Companies A and B" would be sufficient evidence of common ownership. See MPEP § 706.02(I) (2).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SMITA PATEL whose telephone number is (571)270-5837. The examiner can normally be reached on Monday-Thursday, 8:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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SP AU1793

11/02/2009

/Melvin Curtis Mayes/

Supervisory Patent Examiner, Art Unit 1793